Implications Of Financial Inclusion For Poverty In Cameroon: A Gendered Analysis

By

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ABSTRACT

Using the FinScope Consumer survey, this study examines the implications of financial inclusion for poverty in Cameroon. Specifically, it assesses the impact of financial inclusion on overall welfare, including by gender. In order to account for the endogenous selection bias resulting from unobserved confounders and for structural differences between users and non-users of financial services in terms of a welfare-generating function, we employ an endogenous switching regression. The probit results indicate that men have a higher probability of being financially included compared to women. We further observe that financially included individuals are expected to make welfare gains of about XAF14,544 per month. The results also show that the impact of financial inclusion is higher for men compared to women. These results underscore the need for targeted policies to address gender disparities in access to financial services. Implementing policies that promote equal opportunities for men and women in the financial landscape is essential for fostering sustainable economic development and reducing poverty in Cameroon.

Key words: Financial inclusion, endogenous switching, welfare, Cameroon, gender

JEL codes: O16, I32, J16

1. INTRODUCTION

In recent years, financial inclusion (FI) has moved up the global policy agenda and gained significant interest due to its potential to break the vicious cycle of poverty. Globally, financial inclusion has lately been the subject of numerous economic investigations (López and Winkler, 2019). According to Park and Mercado (2018), financial inclusion promotes inclusive growth, a better livelihood and poverty reduction. Financial inclusion is also perceived as a dynamic tool for attaining sustainable growth, employment generation, poverty reduction and income equality for both developed and developing countries (Chibba, 2009; Omar and Inaba, 2020). Also, financial empowerment has been proven to increase female participation in community decision-making, thereby improving their wellbeing and combatting the socioeconomic marginalization of women (World Bank, 2020). Because women are very often marginalized and discriminated against, they are less likely to be financially included than men (Mndolwa and Alhassan, 2020).

As such, financial inclusion has become a policy priority for many countries because pro-poor growth policies have recognized an inclusive financial system as one of the most important instruments for achieving inclusive growth (Sarma and Pais, 2011; Haq et al., 2018). Against this background, the United Nations member countries have included financial inclusion as a formal target and a key objective in their development agenda (Sahay et al., 2015). In 2018, the World Bank also identified financial inclusion as a means to achieve 7 of the 17 Sustainable Development Goals (SDGs). Two of the 7 SDGs are eliminating extreme poverty (SDG 1) and promoting gender equality (SDG 5). The widespread adoption of digital financial services, such as mobile money, Internet banking, and electronic payment systems, have lowered the cost of financial transactions, thereby increasing outreach to the poor (Sahay et al., 2020; World Bank, 2020). The financial landscape in Africa has been comprehensively transformed by mobile financial services, with increased outreach to rural areas where the majority of the population had formerly been excluded (Nguena, 2019; Pazarbasioglu et al., 2020).

Despite these developments, gender disparities in financial inclusion still persist across regions and time. According to the World Bank, in 2014 there were still millions of people in developing countries who were involuntarily excluded from the financial system. These are generally underprivileged population segments such as women, low-income earners and rural dwellers. Also, the gender gap in owning a bank account in 2017 was 7% globally and 9% in developing countries. According to the 2017 Global Findex database, men are more likely than women to own a bank account (World Bank, 2017; Demirgüç-Kunt et al., 2018). The deep digital divide and missed opportunities, particularly for unbanked women and poor populations, were exposed during the COVID-19 pandemic because of the shift towards digital finance (World Bank, 2020). Gender disparities in financial inclusion undermine the important role of women in poverty alleviation and economic development. This is specifically the case in Cameroon, where women account for slightly over 50% of the total population. The literature suggests that enhanced financial inclusion of women is not only desirable in terms of equality and closing of the gender gap, but also for improving women's access to financial inclusion, which can yield more positive societal benefits than improving financial access for men (Duflo, 2012).

Defining financial inclusion is not a straightforward task as the concept of financial inclusion covers a broad range of conditions. Financial inclusion has been defined as the access and use of formal financial services to all, including the most vulnerable (Fouejieu et al., 2020). Mubiru (2012) categorizes financial inclusion as an aspect of social inclusion, which is the possibility for members of an economy to actively be part of

economic and social advancements, both to benefit from them and to contribute to them. In this study, we consider financial inclusion as the process of guaranteeing access and usage of formal financial services at an affordable price for all members of the economy (Sarma, 2008 and Ozili, 2018). A key feature of the financial inclusion concept, as compared with that of financial development, is that there is a focus on equality and inclusivity. Therefore, a key element of financial inclusion is equality of financial access between genders, as well as between other groups, such as rural dwellers and low-income households..

Individuals ravaged by poverty are often characterized by low income and consumption levels, and they often live without clean water, proper housing, healthy food, proper medical attention and better education opportunities, among other things (Tita and Aziakpono, 2017; Koomson et al., 2020). In the last decades, particularly the 2000s, there has been a noticeable increase in attention on reducing issues such as poverty (Cardoso and Teixeira, 2020). Amidst the multitude of factors influencing these issues, the access and usage of financial services have gained the attention of scholars and policymakers. This is because financial services help individuals escape poverty by enabling easier investment in education, business and health (Asuming et al., 2019).

According to Deonandan (2019), poverty is a condition in which an individual cannot obtain adequate primary needs to sustain their life. As defined by the World Bank, the international benchmark for extreme poverty is surviving on less than US$1.9 a day. According to the Government of Cameroon (2003), poverty is the state in which individuals are surviving on less than 339,715FCFA a year as of 2014. The rate at which the poor lack financial resources to meet their minimum standard of living is still a major challenge for African countries (Tita and Aziakpono, 2017; Ofori-Abebrese et al., 2020). According to the World Bank (2014), there are still millions of people in developing countries that are involuntarily excluded from the financial system. Choudhury and Bagchi (2016) indicated that financial exclusion is partly responsible for the persistent state of poverty and financial hardship in developing countries. Therefore, an important solution is to consider an initiative to extend levels of financial inclusion among the poor (Imai et al., 2012). Bateman et al. (2019) also stated that financial inclusion is one of the solutions for eradicating poverty in the world.

In this paper, Cameroon is used as a case study to provide new empirical evidence because Cameroon is a country with relatively low levels of financial inclusion and high rates of poverty and gender inequality. Although 39% of the national population lives below the poverty line, this rate rises to 51.5% for women, of which 79.2% are underemployed (World Bank, 2020). The protracted socioeconomic impact of the COVID-19 pandemic prevents vulnerable populations from meeting their basic needs, resulting in the contraction of Cameroon's economy in 2020 which led to an additional 400,000 people falling into extreme poverty. Furthermore, according to the 2022 World Food Programme on Cameroon Country Brief, an estimated 40% of Cameroon's 27.2 million population live below the poverty line, of which 52% are women.

Therefore, understanding the role of financial inclusion on poverty overall, and by gender, can be helpful by invigorating public policy debates related to poverty reduction and gender equality in Cameroon. In this light, a key question arises: What are the implications of financial inclusion for welfare in Cameroon? Specifically, the study seeks to assess the impact of financial inclusion on overall welfare, and by gender. Based on the discussion so far, the research hypothesis can be formulated as: the impact of financial inclusion on welfare is likely to be higher amongst women compared to men.

This study contributes to the existing literature by employing the Cameroon FinScope 2017 dataset to conduct a gendered analysis of the impact of financial inclusion on poverty in Cameroon. The research employs an endogenous switching regression model,

offering a more rigorous approach than several other studies as it simultaneously addresses selectivity bias and endogeneity. In contrast to previous findings, our results show that the average effect of treatment on the treated (ATT) estimate indicates a higher impact of financial inclusion on welfare for the male subsample compared to the female subsample.

Our findings reveal that financial inclusion yields significant welfare benefits with respect to monthly income. Hence, financial inclusion is expected to greatly contribute to poverty alleviation by increasing the monthly income of individuals if the users have basic financial knowledge. We also found that the impact of financial inclusion is higher among men compared to women. The remainder of the paper is structured as follows: Section 2 provides an overview of financial inclusion, Section 3 reviews the theoretical and empirical literature. Section 4 considers the empirical strategy and Section 5 focuses on describing the data. Section 6 presents and discusses the empirical findings and Section 7 reflects with concluding remarks and highlights policy implications.

2. OVERVIEW OF FINANCIAL INCLUSION IN CAMEROON

The financial sector of Cameroon is made up of banks, insurance companies, a state pension fund, and a state-owned mortgage bank. In addition, the country has over 400 microfinance institutions, 2 mobile money operators, a state-owned postal bank and a burgeoning stock market based in Douala. According to the International Monetary Fund (IMF, 2020), the total financial assets of Cameroon represent 40% of national GDP, two-thirds of which is held by banks. The value of mobile banking transactions as a percentage of GDP stood at 30.24% in 2018 (World Bank, 2019). In relation to population, Cameroon has a small bank network. In terms of the distribution of bank branches per 100,000 adults, Cameroon's ranking of 2.2 per 100,000 adults is less than half the average of both lower middle-income countries (LMCs, at 8.1) and sub-Saharan Africa countries (SSAs, at 5.0). As for the distribution of automatic teller machines (ATMs), Cameroon's 4.8 is below the SSA average of 6.46 and significantly below the average of other LMCs at 21.66 (World Bank, 2018).

From Table 1, it is evident that the overall trend of financial inclusion in Cameroon has been positive, even in the brief period from 2011 to 2021. The percentage of adults holding a bank account increased from about 15% in 2011 to 52% in 2021. This increase is reflected by the sharp increase in mobile money account ownership between 2017 and 2021. The shares of both men and women with an account have increased considerably, with the share of women almost tripling. However, despite this, the gender gap still persists, although the gender gap was much wider in 2011 and 2017 than it was in 2014 and 2021.

Table 1 provides data on the gender gap in account ownership. We observed that there is a gender-based differential in account ownership for 2011, 2014, 2017 and 2021. Account ownership in 2011 was 19% and 11% for men and women, respectively. This indicates a gender gap in account ownership of 9% in 2011. By the same token, the gender gap in account ownership was 4%, 9% and 4.5% for 2014, 2017 and 2021, respectively.

Table 1: Overview of financial inclusion in Cameroon

Ownership of account (% of adults aged 15+)				
	2011	2014	2017	2021
Account ownership at a financial institution or through a mobile money provider	14.8%	12.2%	34.6%	51.7%
Financial institution account	_	11.35	26.87%	23.5%
Mobile money account	_	_	15.1%	42.4%
Gender gap in account ownership (% of adults aged 15+)				
	2011	2014	2017	2021
Male	19%	14%	39%	54.2%
Female	11%	10%	30%	49.3%
Use of financial services (% of adults aged 15+)				
	2017		2021	
Saved any money in the past year	57%		59%	
Borrowed any money in the past year	53%		58.6%	
Coming up with emergency funds: not possible	52%		49.4%	
Sent or received domestic remittances in the past year	52%		54%	
No deposit and no withdrawal in the past year	21%		18%	
Made or received digital payments in the past year	29%		49.9%	

Source: Global Findex Database (2021).

3. LITERATURE REVIEW

3.1 Theoretical Literature

The theoretical link between financial inclusion and poverty could be viewed through the theory of change that links "programme inputs and activities to a chain of observed outcomes" (Rogers, 2008). In this study, we adopt the theory of change developed by Duvendak and Mader (2020). This theory of change explains how financial inclusion activities are expected to produce intended changes. In our theory of change, an individual's usage of financial services such as account ownership, credit and mobile money could lead to direct changes and on to more transformative outcomes. We distinguish two outcome categories in this study: economic and gender.

According to the economic perspective, financial inclusion can affect poverty directly and indirectly (Koomson et al., 2020). Direct financial inclusion alleviates household poverty by improving access to financial services, which are expected to provide poor households with the necessary resources to meet their current consumption and investments needs (King and Levine, 1993). Financial inclusion could also directly benefit poor people through changes in their financial behaviours (World Bank, 2014), such that they use financial services to gain access to new income sources or enhance existing ones, to save money that they would otherwise spend or lose, to invest in assets, to sustainably consume more goods or to cope with shocks. The indirect channel can be viewed through finance-growth enhancing theories that can be traced back to Schumpeter (1934) and McKinnon (1973). The indirect channel explains how gradual finance-induced economic growth benefits the poor through job creation and increased

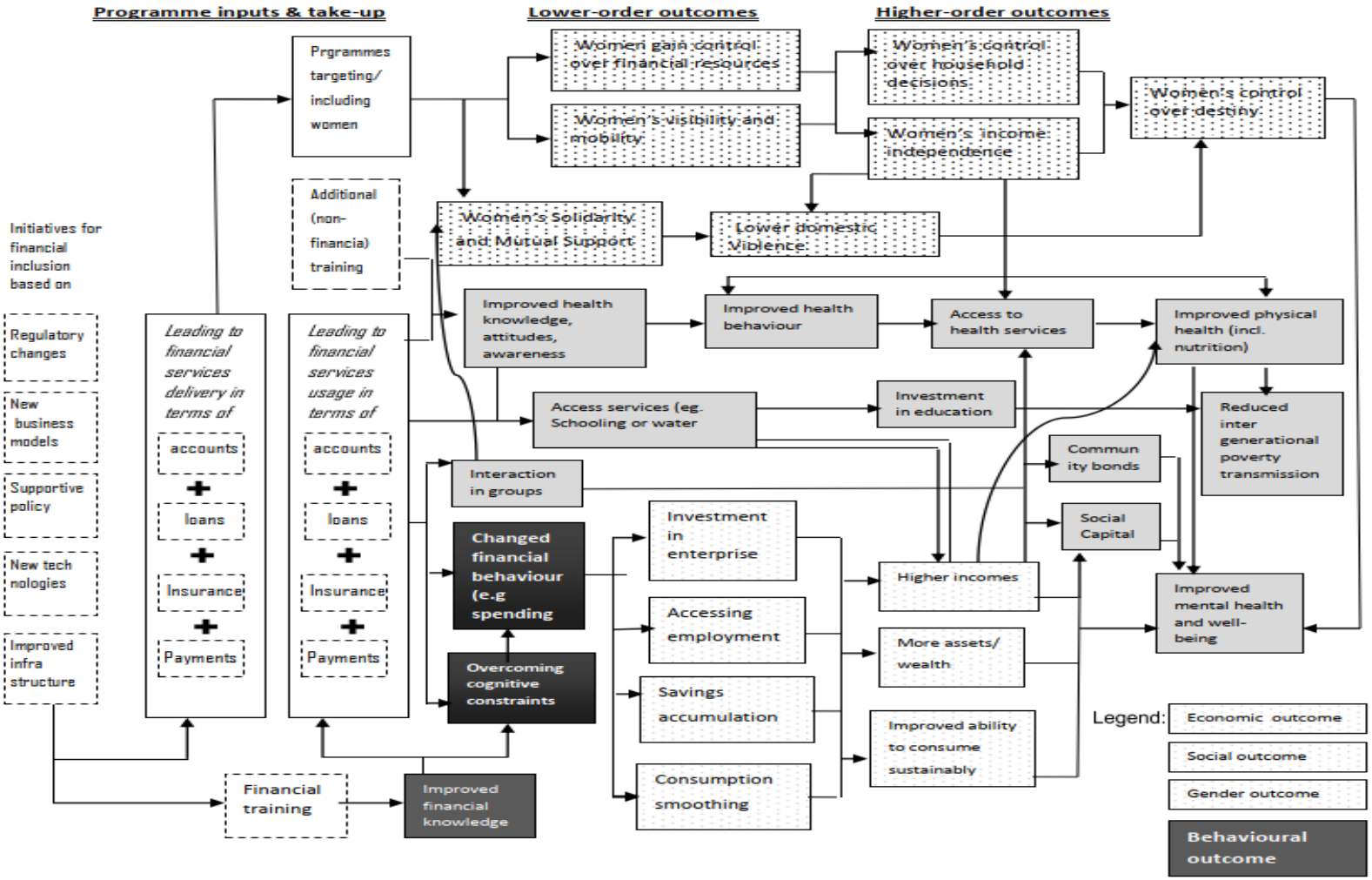
government social spending on health, education and social protection (Abosedra et al., 2016; Perotti, 1993). Indeed, access to financial services gives poor households the opportunity to engage in participatory long-term investments, helps in the allocation of production resources in an efficient manner and, hence, achieves a reduction in the cost of capital (Demirgüç-Kunt et al., 2018).

Regarding gender implications, the issue of financial inclusion involves challenges to ensure gender equality in access to and use of financial products and services. The impact of such services varies between women and men, and could potentially have increased benefits for women. Programmes like microfinance and self-help groups, that historically targeted women, contribute to women's empowerment. Digital financial services, such as mobile money, offer independent saving opportunities for women (Hendriks, 2019). Financial inclusion enhances women's control over resources, thereby strengthening their position in households and reducing poverty. Additionally, it provides women with independent income sources, fostering empowerment and visibility in business activities. Access to affordable financial products for unbanked women stimulate economic growth and job creation, and offer broader societal benefits.

Financial inclusion may impact men more positively than women due to gender inequalities in employment and income. Limited access to formal employment and wage disparities can hinder women's engagement in financial activities. By contrast men, who typically have greater access to resources, may benefit more from opportunities for income generation and asset accumulation. Economists argue that supply-side constraints, such as high interest rates and collateral requirements, disproportionately exclude women from formal credit markets. Credit rationing discourages female entrepreneurs, and when they access loans they often face stricter requirements than men (Morsy and Youssef, 2017). Female entrepreneurs may self-select out of the credit market due to perceived low creditworthiness. Despite expectations of competitiveness, women entrepreneurs are less financially included than men, suggesting a potentially larger marginal effect of financial inclusion for women. Alternatively, one could argue that men, assumed to be more prone to risk-taking, might experience greater gains from borrowing if their projects succeed.

To better understand the theory and expectations of the impacts of financial inclusion, we adopt the theory of change diagram developed by Duvendak and Mader (2020). As indicated by the different shadings in Figure 1, Duvendak and Mader distinguish four outcome categories: economic, social, gender and behavioural.

Figure 1: Financial inclusion impacts at individual/household level: Theory of change flow diagram



Source: The theory of change flow diagram developed by Duvendak and Mader (2020).

3.2 Empirical Literature

3.2.1 Determinants of Financial Inclusion

In this section, we review the studies that examine the determinants of financial inclusion. Cassimon et al. (2022) assess the drivers of and the barriers to people's financial inclusion in Mexico and found that working in the formal sector, level of wealth and income, educational attainment and age are the socioeconomic characteristics that most affect the likelihood of holding any formal financial product. However, they also indicated that the relative importance of these characteristics varies across financial products. Ajide (2017) examines the determinants of financial inclusion by specially accounting for the role of institutions in a panel of 18 SSA countries. The findings consistently stress the importance of institutions, together with other control variables like GDP per capita, inflation, bank concentration and z-scores, as key drivers of financial inclusion. Kumar (2012) examined the status as well as the determinants of financial inclusion in India, using both a fixed effects and a dynamic panel generalized methods of moments (GMM) methodology, on 29 major states and union territories between 1995 and 2008. The results showed that a branch network has an unambiguous beneficial impact on financial inclusion.

Beck et al. (2007b) examined factors that affect household and small firms' access and use of banking services. With regard to determinants of financial inclusion, they find a positive relationship between financial inclusion variables and GDP, the quality of overall institutional environment and the level of infrastructure. Honohan (2008) emphasized the importance of good institutions for financial institutions. According to the author, countries with institutions that have good governance are expected to have increased trust in the economy, which can lead to the growth and expansion of financial institutions. The lack of trust can stem from previous bank closures, embezzlement of funds or political seizures and expropriations, and the consequent fear that they might recur. Xu (2020) finds that specifically lack of (social) trust is a barrier to financial inclusion for countries with weak formal institutions. Ghosh (2021) shows that trust significantly enhances account ownership and use in India. From a macroeconomic perspective, the level of financial inclusion in a country is also determined by the rate of unemployment and inequality in the country (Sarma and Pais, 2011). A higher proportion of the population is excluded from income-generating activities due to high unemployment and inequality.

It is frequently argued that information and communications technology (ICT) is instrumental in enhancing financial inclusion (Honohan, 2008; Andrianaivo and Kpodar, 2011; Ouma et al., 2017). To deploy financial services, ICT infrastructure could be used across a wider geographical zone to reach remote areas at an affordable cost. An example of how ICT has helped in dealing with challenges of distance and reducing the transaction cost of extending financial services to individuals is the deployment of branchless banking services such as mobile money and, more recently, mobile banking. People and small businesses with access to mobile money are more likely to be financially included.

Gautier et al. (2020) analyze the determinants of financial inclusion in Cameroon between 2011 and 2014 and found that the main determinants of financial inclusion in Cameroon to be education and income. They further reveal that the education variable negatively influences all indicators of financial inclusion. Income positively affects all indicators of financial inclusion over the two periods, apart from the type of credit to which it is negatively correlated in 2011. On a similar note, Omar and Inaba (2020) examined the determinants of financial inclusion. They constructed a novel index of financial inclusion using a broad set of financial sector outreach indicators, finding that

per capita income, ratio of internet users, age dependency ratio, inflation and income inequality significantly influence the level of financial inclusion in developing countries.

Allen et al. (2016) provide an individual-level and country-level analysis on the determinants of financial inclusion. From the individual-level analysis, they find that those who earn higher incomes are older, live in urban areas, have a higher level of education, live in smaller households and are married and employed, are more likely to own an account and frequently use their bank accounts. With respect to account ownership, they did not find evidence of a significant difference between men and women, but the analysis indicates that men are more likely to frequently use an account. The country-level analysis shows the importance of the architecture of the financial system as a determinant of financial inclusion. Another individual determinant of financial inclusion is financial literacy. For example, Koomson et al. (2020) carried out an experimental study on financial literacy in Ghana and found that women and youth that are more financially literate are more likely to be financially included.

3.2.2 Financial Inclusion Gender Gap

Starting in 2011, the World Bank Findex Database has allowed us to empirically identify the existence of gender disparities in financial inclusion, although the issue has been known about for some time. The World Bank Findex Database allows us to observe the worldwide prevalence of gender disparities in financial inclusion between 2011 and 2021. Over this period, gender gaps have closed in some regions such as East Asia, while in other regions such as SSA, the gender gap has considerably widened over time.

According to the World Bank Findex Database (2021), the overall global trend in financial inclusion has been positive between 2011 and 2021. Worldwide, for the proportion of men and women with a bank account, the gender gap was 8.1 percentage points in 2011, that decreased to 7.1 percentage points in 2014, but slightly increased to 7.4 percentage points in 2017. 2021 saw a considerable drop in the global gender gap: 78% of men and 74% of women had an account, giving a gender gap of 4 percentage points. Particularly for high income economies, the gender gap stood at 4 percentage points in 2011 and has been stagnant at 1 percentage point from 2014 to 2021. Specifically, the gender gap in account ownership across developing economies has fallen to 6 percentage points from 9 percentage points, where it hovered for many years. More specifically, in SSA the gap rose from 5% in 2011 to 12% in 2021, triple the global average and double that of other developing regions.

Ghosh and Vinod (2017) carried out a detailed study of financial access microdata in India and further explored the gender gap in financial inclusion. First, they confirmed the existence of a gender gap in financial inclusion in India. They indicated that compared to male-headed households, female-headed households are 8% less likely to access formal finance and 20% are less likely to make use of cash loans. They also noted that compared to male-headed households, female-headed households are 6% less likely to access formal finance. Furthermore, Ndoya and Tsala (2021) analyzed the drivers of the gender gap in financial inclusion in Cameroon. Analyzing six distinct financial inclusion variables captured by access to and use of financial inclusion products and services, they show that there is a gender gap in all indicators of access to and use of financial products and services in favour of men. Using Findex data, Ansar et al. (2021) found that gender gaps in financial inclusion are much smaller among employed persons. This suggests that differences in labor force participation are a key driver of these disparities.

3.2.3 Impact of Financial Inclusion on Poverty/Welfare

Although financial inclusion is one of the most widely recognized areas of activity in international development, papers assessing the effect of financial inclusion on poverty are still rare, as stated by Schmied and Marr (2016). Inoue (2019) examined the impact of financial inclusion on poverty reduction in India. The study used an unbalanced panel dataset for India from 1973 to 2004, using a generalized method of moments (GMM) estimation to estimate the effect of financial inclusion on poverty ratios for public sector banks and financial deepening for private sector banks. The study revealed that financial inclusion is statistically inversely related to the poverty ratio for public sector banks, but not for private sector banks.

Using the logit model, Dawood et al. (2019) studied whether financial inclusion eased household poverty. They indicated that financial inclusion has the tendency to reduce the probability of households being in absolute poverty. In a similar study, Churchill and Marisetty (2020) investigated the effect of financial inclusion on poverty using 45,000 households in India. The study revealed that there is a negative relationship between financial inclusion and poverty, implying that financial inclusion reduces poverty. Koomson et al. (2020) examined the effect of financial inclusion on poverty and vulnerability to poverty of Ghanaian households. Using a three-stage feasible least squares model to estimate households' vulnerability to poverty, through the probit technique, they found that an increase in financial inclusion has two effects on household poverty. First, it is associated with a decline in a household's likelihood of being poor by 27%. Second, it prevents a household's exposure to future poverty by 28%. Similarly, Sakyi-Nyarko et al. (2022) investigated the relationship between financial inclusion and household wellbeing in Ghana. Their result indicates that there are significant welfare gains to be had from increased financial inclusion.

Anthony et al. (2021) investigated the threshold effect of financial inclusion on poverty reduction in SSA and found that, beyond a threshold level of 0.365, financial inclusion would lead to poverty reduction with money supply being positively significant towards poverty reduction in SSA. Furthermore, Omar and Inaba (2020) estimated the impact of financial inclusion on poverty reduction and income inequality, and revealed that financial inclusion reduces poverty rates and income inequality significantly in developing economies. Equally, Jabir et al. (2017), studying the effect of financial inclusion on poverty among the low-income household level in SSA, suggest that financial inclusion significantly reduced the level of poverty in SSA through providing net wealth and larger welfare benefits to the poor.

Burgess and Pande (2005) investigated whether the state-led expansion of rural bank branches in India had a negative effect on poverty. They find a robust negative impact of newly opening banks in those locations. Moreover, a study by Ellis et al. (2010) shows that households with access to financial products and services are enabled to invest in activities contributing to a higher future income and, as a consequence, to growth. Even in the poorest income groups, borrowing and saving decisions take place for a variety of investment purposes. Brune et al. (2011) focus on rural banks in Malawi and find that increased financial inclusion through commitment saving accounts improves the access to savings for agricultural input use and, therefore, improve the wellbeing of households in poverty.

By taking the income growth of the lowest income share as well as the headcount growth of people living on less than US$1 per day as the dependent variable, Beck et al. (2007b) examined the effect of financial inclusion on poverty. They found a significant positive relationship between private credit and poverty alleviation. Furthermore, they also found that compared to the rich, there is a disproportionate benefit of financial

inclusion for the poor, resulting in lower income inequality. Schmied and Marr (2016) assessed the relationship of financial inclusion and poverty in Peru. In their study, financial inclusion has a small, but eradicating, effect on different measures of poverty. Hussaini and Chibuzo (2018) also found a negative effect of financial inclusion on poverty in Nigeria.

To extend the existing literature, this study provides new evidence by examining the impact of financial inclusion on poverty in Cameroon while considering the gender implications. The study also makes use of an endogenous switching regression model, which is more rigorous than the model adopted by several other studies as it corrects simultaneously for sample selection bias and endogeneity. Further, conducting a gendered analysis and focusing on Cameroon, the research provides a unique contribution to the literature and expands the knowledge of this field.

4. EMPIRICAL STRATEGY

We employ an endogenous switching regression in our study. The endogenous switching regression is employed to assess the impact of financial inclusion on welfare in Cameroon. Monthly income is used as a proxy for individual welfare.

4.1 Measure of Financial Index (FI)

We propose to construct a composite index of household financial inclusion. To achieve this, we aim to use a multiple correspondence analysis (MCA). The most widely used functional form is the construction of composite indicators, given as follows:

$$FI_i = \frac{1}{K}\sum_{k=1}^{K}\sum_{j_k=1}^{J_k} {W_{j_k}}^{k}\, {I_{j_k}}^{k} \quad (1)$$

Where k denotes number of dimensions with *k = (1, 2, …, K)*, *j* represents the number of modalities of each dimension with *j*= (*1, 2,…Jk*) and *I* denotes the binary (0/1) indicator of each modality. *W* represents the weight obtained with MCA. The variables (dimensions) to consider in the construction of the financial inclusion index are savings, receipt of remittance, ownership of financial products (ownership of mobile money account, ownership of insurance policy), and use of financial services (transact using cheque book, transact using ATM, transact using e-banking). To allow the financial inclusion index to be between 0 and 1, the index is normalized using the min-max approach. The financial inclusion dummy is then defined as individuals whose financial inclusion index is greater than the median index=1; and 0 otherwise.

4.2 Modelling the Effect of Financial Inclusion on Wellbeing

To capture the effect of financial inclusion on welfare (proxied by monthly income), the welfare generating function can be written as:

$$\ln W_i = \beta' X_i + \delta FI_i + \varepsilon_i \quad (2)$$

Where $\ln W_i$ is the log of monthly income as proxy for welfare; X is a column vector of individual, household and community characteristics, which are expected to determine individual welfare; β' is a row vector of corresponding parameters; and FI denotes household financial inclusion, which takes the value of 1 if the individual is financially

included and 0, otherwise. The parameter δ, captures the effect of financial inclusion on welfare and ε is the random error term.

However, Equation 2 is likely to yield biased and inconsistent estimates of the effect of financial inclusion based on the idea that the decision to use a financial service is potentially endogenous, and also because the decision to use a financial service is likely not random. The source of endogeneity can be traced to the correlation between financial inclusion and the error term arising from omitted variables and the occurrence of measurement error. Also, the relationship between financial inclusion and welfare may be such that welfare may be a result of financial inclusion or high welfare may lead to greater financial inclusion. As such, we also acknowledge the possibility of reverse causality as another source of endogeneity.

To address the sample selectivity bias, it is customary to employ the Heckman (1979) two-step approach. However, this approach is unable to account for potential differences between the groups – financially included and financially excluded. According to Wirba et al. (2021), the problem of selectivity bias and endogeneity can be simultaneously resolved by applying the endogenous switching model in an explicit fashion. Therefore, there is an advantage to using the endogenous switching regression model over other techniques such as the propensity score matching, and the instrumental variable technique is based on the idea that it simultaneously accounts for selectivity bias and endogeneity.

The endogenous switching model considers two regimes: a financially included regime and a financially excluded regime:

$$FI_i^* = \alpha' Z_i + \nu_i \tag{3}$$

Where, $FI_i = 1,\ if\ FI_i^* \geq 0$ (financially included) and $FI_i = 0,\ if\ FI_i^* < 0$ (financially excluded).

FI^* is a continuous latent variable, which determines the individual financial inclusion status. Z is a set of exogenous explanatory variables, α is a vector of parameters to be estimated and ν is the error term. FI is the financial inclusion indicator which takes the value 1 if the individual is financially included, and 0 otherwise.

In the financial included regime, the welfare-generating function is given as:

$$Ln\, W_{1i} = \beta_1{}' X_{1i} + \varepsilon_{1i}\ \ if\ FI_i = 1 \tag{4}$$

While the second (financially excluded) welfare-generating function is given as:

$$Ln\, W_{0i} = \beta_0{}' X_{0i} + \varepsilon_{0i}\ \ if\ FI_i = 0 \tag{5}$$

$\text{Ln}\, W_{1i}$ and $\text{Ln}\, W_{0i}$ represent the log of monthly income for financially included and financially excluded, respectively. X_{1i} and X_{0i} are vectors of individual and community characteristics, while β_1 and β_0 are the corresponding row vector of parameters. ε_1 and ε_0 are the error terms. Although the vectors - Z and X can overlap, at least one variable in Z should not appear in X to properly identify the outcome equations. In the present study, we identify the model using the proportion of neighbourhood associations captured at the village level.

To derive an instrumental variable, we exploit the concept of social interactions to construct a cluster proportion of neighbourhood associations using village-level information. As articulated in Baye et al. (2020), the intuition behind the cluster identification strategy is that the average neighbourhood behavioural tendencies, through the imitation and emulation channels, are likely to influence the decision of an observed individual to use a financial service, but this is unlikely to directly affect its welfare,

except through the decision to use a financial service. The exogeneity of the neighbourhood associations as an instrument is based on the idea that the proportion is captured at the cluster(village) level, which is expected to be beyond the control of the individual in question.

The average treatment effect on the treated (ATT), which in our context gives the welfare attributable to financial inclusion captured by the use/access to financial services, is given as:

$$E(\text{Ln}\, W_{1i} \,|FI_i = 1\,) - E(\text{Ln}\, W_{0i} \,|FI_i = 1\,) = (\beta_1{}' - \beta_0{}')X_{1i} + \left(\sigma_{\varepsilon_1 v} - \sigma_{\varepsilon_0 v}\right)\lambda_1 \qquad (6)$$

The average treatment on the untreated (ATU) is given as:

$$E(\text{Ln}\, W_{1i} \,|FI_i = 0\,) - E(\text{Ln}\, W_{0i} \,|FI_i = 0\,) = (\beta_1{}' - \beta_0{}')X_{0i} + \left(\sigma_{\varepsilon_1 v} - \sigma_{\varepsilon_0 v}\right)\lambda_0 \qquad (7)$$

The average treatment effect (ATE) is then given as:

$$ATE = \Phi(\delta' Z_i)ATT + \left(1 - \Phi(\delta' Z_i)\right)ATU \qquad (8)$$

Equation 8 shows that the average treatment effect (ATE) is the weighted average of the average treatment on the treated (ATT) and the average treatment on the untreated (ATU). ϕ and Φ are the standard normal probability density function and the cumulative distribution function of the standard normal distribution, respectively. λ_1 and λ_0 represent the inverse Mills ratios for users of financial services and non-users of financial services, respectively. (Refer to Appendix B for a fuller description of endogenous switching regression).

5. DATA DESCRIPTION

This study makes use of the FinScope consumer survey undertaken by FinMark Trust (2017), a non-profit organization based in South Africa. The survey was conducted in Cameroon in 2017 with the support of the Cameroon National Institute of Statistics (NIS). The FinScope methodology uses a sampling procedure that ensures minimum acceptable levels for national, urban/rural and regional reliable estimates with acceptable margins of error. A multi-stage sampling methodology is applied, which entails the selection of enumeration areas from recent census or population estimates using probability proportional to size, followed by the selection of households as well as the selection of one adult in the selected household using a Kish grid. Based on face-to-face interviews, a total of 6,826 individuals were surveyed in Cameroon. The data contain detailed information about the demographic and socioeconomic characteristics of the individuals, and their access to and use of formal, informal and mobile money/digital financial services. In addition, there are important variables in the data collection, such as financial literacy, financial capability, income and employment. One of the strengths of these data is its comprehensive information regarding all financial products (that is credit, transfers and remittances, savings, risk and insurance and mobile money). Information regarding variables of interest is captured by the FinScope questionnaire. The demographic section captures information on the level of education, gender, age, marital status and region of residence of a respondent.

Table 2: Descriptive statistics of selected variables

Variable	Description of variables	Mean	Std. Dev.	Min	Max
Monthly income in XAF	Monthly expenditure per year in FCFA	61429.16	71686.01	1	1400000.6
Log (monthly income)	Log points	10.6452	0.9223	0	14.152
Financial inclusion	1 if individual is financially included, 0 otherwise	0.5345	0.4988	0	1
Savings	1 if individual has savings, 0 otherwise	0.5256	0.4994	0	1
Insurance	1 if individual is insured, 0 otherwise	0.1025	0.3034	0	1
Mobile money	1 if individual has a mobile money account, 0 otherwise	0.2991	0.4579	0	1
Use of financial services (transact)	1, if individual transacts using cheque book, ATM, or e-banking, 0 otherwise	0.1422	0.3493	0	1
Remittances	1 if individual received remittance, 0 otherwise	0.4359	0.4959	0	1
Male	1, if individual is a male, & 0, otherwise	0.4865	0.4999	0	1
Age	Expressed in years	36.4346	16.2236	15	94
Age squared	Expressed in years	1590.646	1454.269	225	8836
Married	1 if individual is married, 0 otherwise	0.47817	0.4996	0	1
Primary education	1 if individual has primary education, 0 otherwise	0.2781	0.4481	0	1
Secondary education	1 if individual has secondary education, 0 otherwise	0.4212	0.4938	0	1
Tertiary education	1 if individual has tertiary education, 0 otherwise	0.0753	0.2639	0	1
Urban residency	1 if individual resides in urban area, 0 otherwise	0.454	0.4979	0	1
Anglophone	1 if individual is an anglophone, 0 otherwise	0.205	0.4037	0	1
Self employed	1 if individual is self-employed, 0 otherwise	0.4399	0.4964	0	1
House ownership	1 if individual owns a household, 0 otherwise	0.4854	0.4998	0	1
Proportion of neighbourhood associations at village level	Proportion of associations captured at village level	0.1694	0.2621	0	1

Source: Computed by author using FinScope (2017) data and Stata 15.
Notes: Financial inclusion index is derived using multiple correspondence analysis using the dimensions savings, remittance, mobile money, insurance and financial services, normalized (0 to 1) using min-max approach. Financial inclusion dummy equals 1 if above the median index, 0 otherwise.

Table 2 presents the descriptive statistics for selected variables. It includes the mean, standard deviation, minimum, and maximum values for various financial and demographic indicators. For instance, the average monthly income is 61,429.16 XAF with a substantial standard deviation of 71,686.01 XAF, indicating considerable

variability. The table also shows the proportion of individuals who are financially included (53.45%) and those with savings (52.56%). Additionally, it includes data on education levels, with 27.81% of individuals having primary education and 7.53% having tertiary education. The descriptive statistics highlight key variables relevant to the analysis of financial inclusion and socio-economic factors (see Table 2 for detailed statistics).

6. EMPIRICAL RESULTS

6.1 Mean Comparison Test of Characteristics between Financially Included and Financially Excluded

Table 3 presents the mean comparison of individual characteristics with respect to their financial inclusion status. The findings indicate that the monthly income of financially included individuals is higher than that of financially excluded individuals in the order of about FCFA28,781. This is because financially included individuals often have access to formal financial services that enable them to engage in income-generating activities and accumulate wealth. The positive impact on income resulting from enhanced financial inclusion aligns with the conclusions drawn in earlier research studies (Koomson et al., 2020; Ofori-Abebrese et al., 2020; Mohammed et al., 2017). The Alliance for Financial Inclusion (AFI, 2015) similarly emphasizes that advancements in financial inclusion contribute to the entrepreneurial capabilities of recipients, leading to heightened household monthly income and an overall enhancement in household welfare.

The results also show that a higher proportion of the financially included individuals are men, while a higher proportion of financially excluded are female. This reflects the idea that gender inequality in employment and wage disparities often grant men greater access to formal employment opportunities and higher income levels. These findings are consistent with the findings of Demirgüç-Kunt et al. (2018) and Lotto (2018).

We also observe that, on average, individuals that are financially included are older than financially excluded individuals. In terms of marital status, 34.08% of financially included individuals are single, while 38.31% of financially excluded individuals are single. On average, 54.89% of those financially included are married compared to 46.55% of financially excluded individuals. On average, 2.45% of those financially included are divorced, while 2.93% of financially excluded are divorced.

Table 3: Mean comparison test of individual characteristics between financially included and financially excluded

Variable	Financially included (N=3,873)		Financially excluded (N=2,953)		Difference in mean/proportion	
	Mean	Std. Dev.	Mean	Std. Dev	Difference	Std. Error
Monthly income (XAF)	70,785	80,304	42,004	43,147	28,781***	1819
Log (monthly income)	10.8094	0.8624	10.3041	0.9491	0.5053***	0.0230
Gender (male=1)	0.5157	0.4998	0.4259	0.4946	0.0898***	0.0129
Age	37.1576	14.9252	34.9335	18.5465	2.2241***	0.4184
Age squared	1603.3985	1334.907	1564.1683	1675.162	39.230***	37.578
Married	0.4511	0.0073	0.5337	0.0106	-0.0826***	0.0129
Primary education	0.2876	0.4527	0.2582	0.4378	0.0294**	0.0116
Secondary education	0.4675	0.499	0.3249	0.4685	0.1426***	0.0126
Tertiary education	0.1087	0.3114	0.0059	0.0763	0.1029***	0.0067

Urban residency	0.5327	0.499	0.2907	0.4542	0.2420***	0.0125
Anglophone	0.2342	0.4235	0.1442	0.3514	0.0900***	0.0104
Self employed	0.4589	0.0073	0.4016	0.0104	0.0573***	0.0128
House ownership	0.4252	0.0072	0.6101	0.0103	-0.1849***	0.0127
Proportion of neighbourhood association at village level	0.1913	0.0041	0.1240	0.0046	0.0673***	0.00674

Source: Computed by author using FinScope (2017) data and Stata 15.

On average, 28.76% of financially included individuals have a primary level of education, while 25.82% of financially excluded individuals have primary education. In terms of secondary education, 46.75% of financially included and 32.49% of financially excluded individuals have this level of education. On average, 10.87% of financially included persons have a tertiary level of education, while only 0.59% of financially included persons have this level of education. These results indicate that individuals with at least a secondary school education is more likely to have access to financial services. Furthermore, 53.27% of financially included persons are urban dwellers, while only 29.07% of financially excluded persons are urban dwellers. On average, 23.42% of financially included households are Anglophones, while only 14.42% of financially excluded households are Anglophones.

Regarding the variable proportion of neighbourhood associations, which is used as an instrumental variable in this study, the findings indicate that among the financially included persons the proportion of people belonging to neighbourhood associations is about 19.1%, while amongst financially excluded persons the proportion of belonging to neighbourhood associations is about 12.4%. This indicates a significant difference between financially included and financially excluded in terms of their adherence to neighbourhood associations.

6.2 Determinants of Financial Inclusion in Cameroon

Table 4 presents the coefficients and the marginal effects of the probit model of financial inclusion in Cameroon. Compared to women, being a man increases the probability of being financially included by 4%. The age of the individual positively affects the likelihood of financial inclusion up to a certain age threshold, beyond which it reduces the likelihood of financial inclusion. This quadratic behaviour shows that at an active age individuals are more likely to be financially included, but the probability tends to reduce when they get older. Being a married person does not reduce the probability of financial inclusion.

Table 4: Gender disparity and the probability of financial inclusion

VARIABLES	(1) Coefficient	(2) Marginal effects
Male	0.1042***	0.0404***
	(0.0343)	(0.0133)
Age	0.0637***	0.0247***
	(0.0054)	(0.0021)
Age squared	-0.0005***	-0.0002***
	(0.0001)	(0.0000)
Married	0.0579	0.0225
	(0.0370)	(0.0143)
Primary education	0.6079***	0.2359***
	(0.0492)	(0.0192)
Secondary education	1.1179***	0.4338***
	(0.0514)	(0.0201)
Tertiary education	2.2530***	0.8742***
	(0.1176)	(0.0448)
Urban residency	0.5606***	0.2175***
	(0.0372)	(0.0144)
Anglophone	-0.0460	-0.0179
	(0.0375)	(0.0146)
Self employed	-0.0577	-0.0224
	(0.0417)	(0.0162)
House ownership	-0.2668***	-0.1035***
	(0.0389)	(0.0151)
Proportion of neighbourhood associations	0.3327***	0.1291***
	(0.0657)	(0.0255)
Constant	-2.3275***	
	(0.1130)	
Observations	6,826	6,826

Source: Computed by author using FinScope (2017) data and Stata 15. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The marginal effect shows that the levels of education positively correlate with the probability of being financially included. The degree of correlation intensifies with the level of education. Specifically, compared to uneducated persons, those with a primary education have a 23.6% higher probability of being financially included, while those with a secondary education have about a 43.4% higher probability of being financially included. Those with tertiary education have about an 87.4% higher likelihood of being financially included. Compared with household dwellings in rural areas in the overall sample, households in an urban region have about a 21.8% higher likelihood of being financially included.

The marginal effect results also reveal that compared with individuals who do not own a house, owning a house reduces the likelihood of being financially included by 10.4%. Homeownership in Cameroon can lead to a concentration of wealth in a single asset, which can result in a lack of diversification in an individual's financial portfolio. If a significant portion of an individual's wealth is tied up in a house, it may limit their ability to allocate resources to other income-generating financial assets and services, potentially reducing their overall financial inclusion.

To properly identify the selection equation, the cluster proportion of neighbourhood associations was captured at the village level and used as an instrument. That is, the proportion of individuals belonging to neighbourhood associations in a cluster (village)

where the individual in question finds themself. The findings indicate that a cluster proportion of neighbourhood associations has a positive significant effect on the decision to be financially included. Indeed, a unit increase in this proportion increases the likelihood of being financially included by about 12.9%.

6.3 Endogenous Switching Regression Results

Table 5 presents the OLS and estimates of the endogenous switching regression (ESR) of the determinants of welfare in Cameroon. Following Lokshin and Sajaia (2004), in the context of endogenous switching regression, the Wald test or the likelihood ratio test helps to evaluate the hypothesis of joint independence of the three equations, as well as the covariance coefficients providing information on self-selection. The result of the likelihood ratio test reveals that the three equations (the selection equation and the two regime equations) are jointly dependent, thus revealing evidence of endogeneity that needs to be addressed in the welfare model. The findings also indicate that the covariance coefficients $\rho_{\varepsilon_1 \nu}$ and $\rho_{\varepsilon_0 \nu}$ are significantly positive and negative, respectively. The positive and significant sign of the correlation coefficient $\rho_{\varepsilon_1 \nu}$ indicates that, compared to individuals randomly selected from the overall sample, financially included persons have a higher state of welfare than a randomly selected person from the sample. The negative and significant sign of the correlation coefficient $\rho_{\varepsilon_0 \nu}$ also indicates that, compared to individuals selected at random from the overall sample, financially excluded persons have a lower state of welfare.

Table 5: Endogenous switching regression results

	(1)	(2)	(3)	(4)
		Endogenous switching regression		
	OLS		Financially included	Financially excluded
Variables		Selection	Log income	Log income
Financial inclusion	0.2599***			
	(0.0237)			
Male	0.2527***	0.1049***	0.3135***	0.1622***
	(0.0208)	(0.0343)	(0.0255)	(0.0346)
Age	0.0553***	0.0652***	0.0804***	0.0232***
	(0.0034)	(0.0055)	(0.0048)	(0.0059)
Age squared	-0.0005***	-0.0005***	-0.0008***	-0.0002***
	(0.0000)	(0.0001)	(0.0001)	(0.0001)
Married	0.1462***	0.0614*	0.1309***	0.1152***
	(0.0222)	(0.0370)	(0.0270)	(0.0374)
Primary education	0.0096	0.6116***	0.1162**	-0.0179
	(0.0307)	(0.0493)	(0.0540)	(0.0498)
Secondary education	0.1362***	1.1269***	0.3879***	-0.1287*
	(0.0321)	(0.0516)	(0.0629)	(0.0693)
Tertiary education	0.4908***	2.2719***	0.7311***	-0.0547
	(0.0499)	(0.1180)	(0.0846)	(0.2491)
Urban residency	0.2002***	0.5594***	0.2855***	0.0668
	(0.0234)	(0.0372)	(0.0326)	(0.0482)
Self-employed	-0.0370	-0.0497	-0.0775***	0.0627*
	(0.0226)	(0.0376)	(0.0276)	(0.0378)
Anglophone	0.0368	-0.0586	0.0500	0.0745*
	(0.0258)	(0.0416)	(0.0312)	(0.0438)
House ownership	-0.0040	-0.2671***	-0.0728**	0.0769*
	(0.0241)	(0.0390)	(0.0311)	(0.0410)
Proportion of neighbourhood associations		0.3152***		
		(0.0657)		
Constant	8.9740***	-2.3626***	8.3732***	9.6131***
	(0.0673)	(0.1138)	(0.1574)	(0.1101)
$ln\sigma_{\varepsilon_1 v}$			-0.2474***	
			(0.0137)	
$\rho_{\varepsilon_1 v}$			0.1983**	
			(0.0808)	
$ln\sigma_{\varepsilon_0 v}$				-0.0988***
				(0.0152)
$\rho_{\varepsilon_0 v}$				-0.1611*
				(0.0844)
Wald test of indep. eqns		6.58**		
Log likelihood		-12064.959		
Observations		6,826		

Source: Computed by author using FinScope (2017) data and Stata 15.
Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The results portray organized differences across the two regimes. There is evidence of gender-based discrimination in terms of welfare among the two regimes. In particular, the male gender registers a higher welfare state compared to the female gender in the two

regimes, even more among the financially included. Gender roles and caregiving responsibilities can influence welfare outcomes in Cameroon. Women often bear a disproportionate burden of unpaid care work, such as childcare and household chores. These responsibilities can limit their ability to engage in income-generating activities or to pursue educational and career opportunities.

The results further suggest that for the financially included, all levels of education positively affect welfare, while among the financially excluded, only secondary education has a negative effect on welfare. It is possible that individuals with secondary education in Cameroon, who are financially excluded, face a mismatch between the skills they possess and job market requirements. They may lack the necessary skills or qualifications for higher-paying or more stable employment opportunities.

For both financially included and financially excluded regimes, a married person is likely to have a higher state of welfare compared to a person who is not married. For the financially included, compared with persons dwelling in rural regions, households in urban regions have a higher state of welfare in the order of 28.6%, while financially excluded individuals dwelling in urban areas do not have significant welfare differences compared to their rural counterparts.

6.4 Estimates of the Average Treatment Effect of Financial Inclusion on Welfare

Table 6 presents the results of the estimated average treatment effects of financial inclusion on welfare. Using the msat command in Stata 15 developed by Araar (2015) we generated estimates of the average treatment effect on the treated (ATT), average treatment effect on the untreated (ATU) and the average treatment effect (ATE), which is the weighted average of the first two.

The ATT estimate shows that, on average, those financially included would have made welfare losses of approximately XAF22, and XAF109 per month if they were not financially included. The ATU estimate also indicates that individuals that were not financially included would have made welfare gains in terms of monthly income of approximately XAF4,623 per month if they were financially included. As expected, the ATE lies between the ATT and ATU. It is a positive and significant estimate, representing the average treatment effect for the overall target population (both treated and untreated). This indicates that financially included individuals experience welfare gains of approximately XAF 14,544 per month because of their financial inclusion.

Table 6: Estimated treatment effects based on endogenous switching regression

Index	Estimate (XAF)	Std Err
$E(\text{Ln}\, W_{1i}\,\|FI_i = 1\,) - E(\text{Ln}\, W_{0i}\,\|FI_i = 1\,)$[ATT]	22,108.90	334.607
$E(\text{Ln}\, W_{1i}\,\|FI_i = 0\,) - E(\text{Ln}\, W_{0i}\,\|FI_i = 0\,)$[ATU]	4,622.81	181.50
$\Phi(\delta' Z_i)ATT + \big(1 - \Phi(\delta' Z_i)\big)ATU$ [ATE]	14,544.23	230.65
	Male	
Index estimating average treatment effect on the t	Estimate (XAF)	Std Err
$E(\text{Ln}\, W_{1i}\,\|FI_i = 1\,) - E(\text{Ln}\, W_{0i}\,\|FI_i = 1\,)$[ATT]	24,925.68	395.42
$E(\text{Ln}\, W_{1i}\,\|FI_i = 0\,) - E(\text{Ln}\, W_{0i}\,\|FI_i = 0\,)$[ATU]	3,044.40	195.59
$\Phi(\delta' Z_i)ATT + \big(1 - \Phi(\delta' Z_i)\big)ATU$ [ATE]	15,459.61	273.33
	Female	
Index estimating average treatment effect on the t	Estimate (XAF)	Std Err
$E(\text{Ln}\, W_{1i}\,\|FI_i = 1\,) - E(\text{Ln}\, W_{0i}\,\|FI_i = 1\,)$[ATT]	17,722.34	239.31
$E(\text{Ln}\, W_{1i}\,\|FI_i = 0\,) - E(\text{Ln}\, W_{0i}\,\|FI_i = 0\,)$[ATU]	4,983.25	150.33
$\Phi(\delta' Z_i)ATT + \big(1 - \Phi(\delta' Z_i)\big)ATU$ [ATE]	12,211.28	168.82

Source: Computed by author using FinScope (2017) data and Stata 15.
Notes: ATT: average treatment effect on the treated; ATU: average treatment effect on the untreated; and ATE: average treatment effect.

Table 6 also provides a gendered analysis of the impact of financial inclusion on welfare. These results were obtained by running a separate analysis for the male and female subsamples. The detailed endogenous switching results are presented in Appendix A, in Tables A1 and B2, respectively, for the male subsample and female subsample. For the male subsample, the ATT indicates that financially included men would have experienced welfare losses of about XAF24,926 per month if they were not financially included. Meanwhile, financially included women would have suffered welfare losses of about XAF17,722 per month if they were not financially included.

Regarding the ATU estimate, the gendered analysis results reveal that financially excluded men would have made welfare gains of approximately XAF3,044 per month if they were financially included, while financially excluded women would have made welfare gains of XAF4,983 per month if they were financially included. Contrary to expectations, this ATU estimate shows that the impact of financial inclusion on welfare is higher for the female subsample compared to the male subsample.

The ATE estimates indicate that financially included men are expected to enjoy a welfare premium of about XAF15,460 while financially included women are likely to enjoy welfare gains of about XAF12,211. Based on the ATE of the whole sample estimate, the impact of financial inclusion is likely to be higher among men compared to women. These findings are in line with the results obtained by Mukong and Amadhila

(2021) using Namibian data, but contrary to the findings obtained by Seng (2021) using Cambodian data.

7. CONCLUSION AND POLICY IMPLICATIONS

The main objective of this paper was to assess the implications of financial inclusion for poverty in Cameroon. Specifically, the paper assessed the impact of financial inclusion on welfare overall, and by gender. The mean comparison test of individual characteristics between financially included and financially excluded individuals suggests that, on average, a financially included person enjoys a monthly income premium of about XAF28,781 per month over a financially excluded person in Cameroon. The results also show that about 52% of the financially included are female, while only about 43% of the financially excluded are male. We further observed that, compared to female household heads, being a male household head increases the probability of financial inclusion by 3.1%. Meanwhile, the impact evaluation results indicated that being financially included generates gains in monthly income in the order of about XAF14,544.23. Based on these findings, we can see that financial inclusion yields significant welfare benefits with respect to monthly income. Hence, financial inclusion is expected to greatly contribute to poverty alleviation by increasing the monthly income of individuals if they have basic financial knowledge.

The findings of this study have significant policy implications. The findings, which consider the impact of financial inclusion on welfare through a gender-specific lens, underscore the need for targeted policies to address gender disparities in access to financial services. First, policymakers should prioritize interventions that specifically target women, thereby addressing existing gender disparities in access to financial services. Initiatives such as financial literacy programmes tailored for women can empower them economically. Second, efforts to reduce supply-side constraints, such as high interest rates and collateral requirements, should be explored to enhance overall financial inclusion. Third, in recognizing the potential for financial inclusion to alleviate poverty, policymakers should consider creating an enabling environment for entrepreneurship, especially for women, by providing accessible credit facilities and supportive regulations. Finally, implementing policies that promote equal opportunities for men and women in the financial landscape is essential for fostering sustainable economic development and reducing poverty in Cameroon.

REFERENCES

Abosedra, S., M. Shahbaz and K. Nawaz. 2016. "Modelling causality between financial deepening and poverty reduction in Egypt". *Social Indicators Research,* 126(3): 955–69.

Ajide, K.B. 2017. "Determinants of financial inclusion in sub-Saharan Africa countries: Does institutional infrastructure matter?" *Journal of Applied Statistics, 8*(2): 69-89.

Allen, F., A. Demirgüç-Kunt, L. Klapper, M. Soledad and M. Peria. 2016. "The foundations of financial inclusion: Understanding ownership and use of formal accounts". *Journal of Financial Intermediation*, 27: 1–30.

Andrianaivo, M. and K. Kpodar. 2011. "ICT, financial inclusion and growth: Evidence from African countries". MF Working Paper No. WP/11/73. International Monetary Fund (IMF), Washington, D.C., March 2011.

Anthony, Y.N., Y. Hadrat, T. George, A. Kwasi and T.B. Samuel. 2021. "The effect of financial inclusion on poverty reduction in Sub-Sahara Africa: Does threshold matter?" *Cogent Social Sciences,* 7(1): 1-21.

Ansar, S., R. Deshpande, L. Klapper and A. Koning. 2021. "What drives the financial inclusion gender gap for young women? Blog. *Consultative Group to Assist the Poor (CGAP)(https://www. cgap. org/blog/what-drives-financial-inclusion-gender-gap-young-women)*.

Araar, A. 2015. "Poverty and inequality in developing countries: A review of the literature". *Journal of Development Economics*, 20(4): 567–80.

Asuming, P.O., L.G. Osei-Agyei and J.I. Mohammed. 2019. "Financial inclusion in sub-Saharan Africa: Recent trends and determinants". *Journal of African Business,* 20(1): 112–34.

Bateman, M., M. Duvendack and N. Loubere. 2019. "Is fin-tech the new panacea for poverty alleviation and local development? Contesting Suri and Jack's M-Pesa findings published in Science". *Review of African Political Economy*, 46(161): 480–95.

Baye, F.M., B.N. Epo and J. Ndenzako. 2020. "Female education and full-time employment in Guinea: An ambiguous relationship". *Labor History*, 61(3–4): 267–85.

Beck, T., A. Demirgüç-Kunt and R. Levine. 2007a. "Finance, inequality, and the poor". *Journal of Economic Growth,* 12: 27–49. At https://doi.org/10.1007/s10887-007-9010-6

Beck, T., A. Lekvov and R. Levine. 2007b. "Big bad banks? The impact of U.S. branch deregulation on income distribution". *The Journal of Finance*, 65: 1637–67.

Brune, L., X. Giné J. Goldberg and D. Yang. 2011. "Commitments to save: A field experiment in rural Malawi". World Bank, Washington, D.C.

Burgess, R. and R. Pande. 2005. "Do rural banks matter? Evidence from the Indian social banking". *American Economic Review, 95*(3): 780–95.

Cardoso, S. M. and A.A.C. Teixeira. 2020. "The focus on poverty in the most influential journals in economics: A bibliometric analysis of the "Blue Ribbon" journals". *Poverty & Public Policy*, 12(1): 10–42.

Cassimon, S., A. Maravalle, A. González, A. Pandiella and L. Turroques. 2022. "Determinants of and barriers to people's financial inclusion in Mexico". OECD Economics Department Working Paper No. 1728. Organisation for Economic Co-operation and Development (OECD), Paris, March 2022. At https://www.oecd.org/economy/mexico-economic-snapshot

Chibba, M. 2009. "Financial inclusion, poverty reduction and the millennium development goals". *The European Journal of Development Research*, 21(2): 213–30.

Choudhury, S.R. and D. Bagchi. 2016. “Financial exclusion: A paradox in developing countries”. *Journal of Economics and Finance,* 3(1): 40–5.
Churchill, S.A. and V.B. Marisetty. 2020. “Financial inclusion and poverty: A tale of forty-five thousand households”. *Applied Economics.* 52(16): 1777–88.
Dawood T.C., H. Pratama, R. Masbar and R. Effendi. 2019. “Does financial inclusion alleviate household poverty? Empirical evidence from Indonesia”. *Economics & Sociology*, 12(2): 235–52.
Demirgüç-Kunt, A., L. Klapper, D. Singer, S. Ansar and J. Hess. 2018. “The global Findex database 2017: Measuring financial inclusion and the fintech revolution”. Retrieved 11 January 2018. At http://documents.world bank.org/curated/en/33288 15258 73182 837/pdf/12603 3-PUB-PUBLIC-pubda te-4-19-2018.pdf.
Deonandan, R. 2019. “Defining poverty: A summary of competing models”. In: *Journal of Social and Political Sciences*, 2(1): 17–21.
Duflo, E. 2012. “Hope, aspirations and the design of the fight against poverty”. Stanford University Center for Ethics in Society, Stanford, CA.
Duvendak, J. and Mader, P. 2020. “Impact of financial inclusion in low- and middle-income countries: A systematic review of reviews”. *Journal of Economic Surveys*, 34(3): 594–629.
Ellis, K. A. Lemma and J-P. Rud. 2010. “Investigating the impact of access to financial services on household investment”. Overseas Development Institute, London.
Findex (2021) Cameroon Gender gap report in http://reports.weforum.org/global-gender-gap-report-2017
Fouejieu, A., R. Sahay, M. Cihak and S. Chen. 2020. “Financial inclusion and inequality: A cross-country analysis”. *The Journal of International Trade & Economic Development*. At https://doi.org/10.1080/09638199.2020.1785532
Gautier, T.T., N.N. Luc and D. Djimoudjiel. 2020. “Dynamic analysis of determinants of financial inclusion in Cameroon”. *European Scientific Journal,* 16(1): 106–21
Ghosh, S. 2021. “How important is trust in driving financial inclusion?” *Journal of Behavioral and Experimental Finance,* 30(C): 100515.
Ghosh, S. and D. Vinod. 2017. “What constrains financial inclusion for women? Evidence from Indian micro data”. *World Development*, 92: 60–81.
Government of Cameroon. 2003. “The poverty reduction strategy paper”. Ministry of Economic Affairs, Programming and Regional Development, Cameroon.
Haq, W., N.A. Ismail and N.M. Satar. 2018. “Investigation of household debt through multilevel multivariate analysis: Case of a developing country”. *Journal of Reviews on Global Economics*, 7:297–316. At https://doi.org/10.6000/1929-7092.2018.07.26
Heckman, J. 1979. “Sample selection bias as a specification error”. *Econometrica*, 47(1): 153–62.
Hendriks, S. 2019. “The role of financial inclusion in driving women’s economic empowerment”. *Development in Practice*, 29(8): 1029–38.
Honohan, P. 2008. “Cross-country variation in household access to financial services”. *Journal of Banking and Finance*, 32(11): 2493-2500.
Hussaini, U. and I.C. Chibuzo. 2018. “The effects of financial inclusion on poverty reduction: The moderating effects of microfinance”. *International Journal of Multidisciplinary Research and Development*, 5(12): 188-198.
Imai, K.S., T. Arun and S.K. Annim. 2012. “Microfinance and household poverty reduction: New evidence from India”. *World Development*, 38(12): 1760–74.
IMF. 2020. “Country Report No. 19/247: Fourth review under the extended credit facility arrangement and requests for waivers of non-observance of performance criteria and modification of performance criteria”. Press Release; Staff Report; and Statement by the Executive Director for Cameroon.

Inoue, T. 2019. “Financial inclusion and poverty reduction in India”. *Journal of Financial Economic Policy*, 11(1): 21–33.
Jabir M., L. Mensah and A. Gyeke-Dako. 2017. “Financial inclusion and poverty reduction in sub-Saharan Africa”. *African Financial Journal*, 19: 1–22.
King, R.G. and R. Levine. 1993. “Finance and growth: Schumpeter might be right”. *The Quarterly Journal of Economics*, 108(3): 717–37.
Koomson, I., R.A. Villano and D. Hadley. 2020. “Effect of financial inclusion on poverty and vulnerability to poverty: Evidence using a multidimensional measure of financial inclusion”. *Social Indicators Research*, 149(1): 613–39.
Kumar, P.K. 2012. “Determinants of financial inclusion: A study of some selected districts of West Bengal, India”. *Indian Journal of Finance*, 5(8): 29–36.
Lokshin, M. and Z. Sajaia. 2004. “Household behavior in the presence of alcohol and drug addiction”. *Journal of Behavioral Economics*, 10(3): 275–88.
López, T. and A. Winkler. 2019. “Does financial inclusion mitigate credit boom-bust cycles?” *Journal of Financial Stability*, 43: 116—29.
Lotto, J. 2018. “Examination of the status of financial inclusion and its determinants in Tanzania”. *Sustainability*, 10(8): 2873. At https://doi.org/10.3390/su10082873
Maddala, G. S. (1986). Disequilibrium, self-selection, and switching models. *Handbook of Econometrics*, 3: 1633–1688. Amsterdam: North-Holland.
McKinnon, R.I. 1973. *Money and Capital in Economic Development*. Washington: Brookings Institution Press.
Mndolwa, F.D. and A.L. Alhassan. 2020. “Gender disparities in financial inclusion: Insights from Tanzania”. *African Development Review*, 32(4): 578–90. At https://doi.org/10.1111/1467-8268.12462
Mohammed, J.I., L. Mensah and A. Gyeke-Dako. 2017. “Financial inclusion and poverty reduction in sub-Saharan Africa”. *African Finance Journal*, 19(1): 1–22.
Morsy, S. and I. Youssef. 2017. “The impact of economic policies on employment in developing countries”. *Journal of Development Economics*, 42(3): 315–28.
Mubiru, J. 2012. “Financial inclusion as tool for combating poverty: Joseph Mubiru memorial lecture”. Bangladesh Bank. At https://www.bou.or.ug/bou/bou-website/bouwebsitecontent/MediaCenter/speeches/Joseph_Mubiru_lectures/2011/All/17th_JMML_Presentation_-_Guest_Speaker.pdf
Mukong, A.K. and E.M. Amadhila. 2021. “Financial inclusion and household wellbeing in Namibia”. *Southern African Business Review*, 25: 1–21.
Ndoya, H.H. and O.N. Tsala. 2021. “What drives gender gap in financial inclusion? Evidence from Cameroon”. *African Development Review*, 33(4): 674–87.
Nguena, C.L. 2019. “Mobile financial and banking services development in Africa”. Working Paper No. 323. African Development Bank, Abidjan, October 2019.
Ofori-Abebrese, G., S.T. Baidoo and E. Essiam. 2020). “Estimating the effects of financial inclusion on welfare in sub-Saharan Africa”. *Cogent Business & Management*, 7(1): 1839164.
Omar, M.A. and K. Inaba. 2020. “Does financial inclusion reduce poverty and income inequality in developing countries? A panel data analysis”. *Journal of Economic Structures*, 9(37): 1–25.
Ouma, S.A., T.M. Odongo and M. Were. 2017. “Mobile financial services and financial inclusion: Is it a boon for savings mobilization?” *Review of Development Finance*, 7(1): 29–35. At https://doi.org/10.1016/j.rdf.2017.01.001
Ozili, P.K. 2018. “Impact of digital finance on financial inclusion and stability”. *Borsa Istanbul Review*, 18(4): 329–40.
Park, C.-Y. and R. Mercado. 2018). “Financial inclusion, poverty, and income inequality”. *The Singapore Economic Review*, 63(1):185–206.

Pazarbasioglu, C., A.G. Mora, M. Uttamchandani, H. Natarajan, E. Feyen and M. Saal 2020. “Digital financial services”. World Bank, Washington, D.C.
Perotti, R. 1993. “Political equilibrium, income distribution, and growth”. *The Review of Economic Studies*, 60(4): 755–76.
Rao, E.J. and M. Qaim. 2011. “Supermarkets, farm household income, and poverty: Insights from Kenya”. *World Development*, 39(5): 784–96.
Rogers, P.J. 2008. “Using programme theory to evaluate complicated and complex aspects of interventions”. *Evaluation*, 14(1): 29–48.
Sahay, R., M. Cihak, P.M. N’Diaye, A. Barajas, S. Mitra, A. Kyobe, Y.N. Mooi and S.R. Yousefi. 2015. “Financial inclusion: Can it meet multiple macroeconomic goals?” IMF Staff Discussion Notes 1, No. 5/17. International Monetary Fund, Washington, D.C..
Sahay, R., U. Eriksson von Allmen, A. Lahreche, P. Khera, S. Ogawa, M. Bazarbash and K. Beaton. 2020. “The promise of fintech: Financial inclusion in the post COVID-19 era”. Departmental Paper No. 20/09. IMF, Washington, D.C.
Sakyi- Nyarko, C., A.H. Ahmad and C. Green. 2022. “The role of financial inclusion in improving household well-being”. *Journal of International Development*, 34(8), 1606-1632. At https://doi.org/10.1002/jid.3661
Sarma, M. 2008. “Index of financial inclusion”. Working Paper No. 215. Indian Council for Research on International Economic Relations, New Delhi, June 2008.
Sarma, M. and J. Pais. 2011. “Financial inclusion and development: A cross country analysis”. Paper presented at the Annual Conference of the Human Development and Capability Association, New Delhi, September 10–13, 2011.
Schmied, J. and A. Marr. 2016. “Financial inclusion and poverty: The case of Peru”. *Regional and Sectoral Economic Studies*, 16(2): 1-26.
Schumpeter, J.A. 1934. *Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*. Harvard University Press, Cambridge, MA.
Seng, K. 2021. “The poverty-reducing effects of financial inclusion: Evidence from Cambodia”. In *Financial Inclusion in Asia and Beyond* 1st edition. Edited by D. T. K. Nguyen and S. S. Sharma. Routledge, London.
Tita, A.F., and M.J. Aziakpono. 2017. « The effect of financial inclusion on welfare in sub-Saharan Africa: Evidence from disaggregated data”. *African Review of Economic and Finance*, 9(2): 30–65.
Wirba, E.L., F.A. Akem and F.M. Baye. 2021. “Earnings-gap between men and women in the informal labour market of Cameroon.” *Review of Economic Development*. 25(3): 1466-1491.
World Bank. 2014. *Global Financial Development Report 2014: Financial Inclusion*. Washington, D.C.: World Bank.
World Bank. 2017. *Global Financial Development Report 2014: Financial Inclusion*. Washington, D.C.: World Bank.
World Bank. 2018. “The little data book on financial inclusion”. AFDB Report. At www.afdb.org/fileadmin/uploads/afdb/Documents/Project and Operations /Cameroon - Joint 2015
World Bank. 2019. http://pubdocs.worldbank.org/en/819481492188154977/mpo-cmr.pdf
World Bank. 2020a. “Digital financial services”. World Bank, Washington, D.C. Available at: https://www.worldbank.org/en/topic/financialsector/brief/digital-financial-services.

World Bank. 2021. World Bank. (2021). Financial inclusion and development: Recent evidence from the World Bank Global Findex Database. Available at: https://globalfindex.worldbank.org/

World Food Programme Cameroon Country Brief. 2022. *Saving Lives Changing Lives*. World Food Programme, Yaoundé, Cameroon.

Xu, X. 2020. "Trust and financial inclusion: A cross-country study". *Finance Research Letters*, 35: 101310.

APPENDIX A: ENDOGENOUS SWITCHING FRAMEWORKS

Table A1: Endogenous switching regression framework for male subsample

	(1)	(2)	(3)	(4)
		Endogenous switching regression		
	OLS		Financially included	Financially excluded
Variables		Selection	Log income	Log income
Financial inclusion	0.3057***			
	(0.0330)			
Age	0.0713***	0.0707***	0.1008***	0.0312***
	(0.0049)	(0.0084)	(0.0071)	(0.0090)
Age squared	-0.0007***	-0.0006***	-0.0010***	-0.0003***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Married	0.1396***	0.1409**	0.1268***	0.0764
	(0.0341)	(0.0608)	(0.0421)	(0.0593)
Primary education	0.1231***	0.6201***	0.2740***	0.0877
	(0.0458)	(0.0768)	(0.0817)	(0.0740)
Secondary education	0.2089***	1.0991***	0.5009***	-0.0653
	(0.0468)	(0.0790)	(0.0906)	(0.1013)
Tertiary education	0.5070***	2.3981***	0.8169***	0.0004
	(0.0662)	(0.1743)	(0.1169)	(0.3594)
Urban residency	0.1738***	0.6349***	0.3003***	-0.0283
	(0.0324)	(0.0549)	(0.0456)	(0.0736)
Self-employed	-0.0192	-0.0410	-0.0550	0.1085*
	(0.0316)	(0.0564)	(0.0380)	(0.0568)
Anglophone	0.0037	-0.1106*	0.0050	0.0557
	(0.0355)	(0.0608)	(0.0440)	(0.0605)
House ownership	-0.0759**	-0.3338***	-0.1557***	0.0276
	(0.0340)	(0.0581)	(0.0444)	(0.0613)
Neighbourhood associations		0.4645***		
		(0.0986)		
Constant	8.8621***	-2.3577***	8.1409***	9.6297***
	(0.1003)	(0.1763)	(0.2213)	(0.1647)
$ln\sigma_{\varepsilon_1 v}$			-0.2450***	
			(0.0212)	
$\rho_{\varepsilon_1 v}$			0.3021***	
			(0.1147)	
$ln\sigma_{\varepsilon_0 v}$				-0.1776***
				(0.0243)
$\rho_{\varepsilon_0 v}$				-0.1771
				(0.1379)
Wald test of indep. eqns		5.49**		
Log likelihood		-5657.4624		
Observations		3,321		

Source: Computed by author using FinScope (2017) data and Stata 15.
Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table B1: Endogenous switching regression framework for female subsample

	(1)	(2)	(3)	(4)
		Endogenous switching regression		
	OLS		Financially included	Financially excluded
Variables		Selection	Log income	Log income
Financial inclusion	0.2102***			
	(0.0336)			
Age	0.0424***	0.0584***	0.0626***	0.0178**
	(0.0046)	(0.0072)	(0.0067)	(0.0077)
Age squared	-0.0004***	-0.0004***	-0.0006***	-0.0002**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Married	0.1333***	0.0532	0.1145***	0.1414***
	(0.0317)	(0.0504)	(0.0381)	(0.0525)
Primary education	-0.0528	0.6339***	0.0228	-0.0866
	(0.0422)	(0.0656)	(0.0732)	(0.0681)
Secondary education	0.1174***	1.1964***	0.3400***	-0.1512
	(0.0455)	(0.0706)	(0.0887)	(0.0971)
Tertiary education	0.5400***	2.1784***	0.7467***	-0.0809
	(0.0782)	(0.1641)	(0.1234)	(0.3422)
Urban residency	0.2196***	0.4883***	0.2730***	0.1379**
	(0.0337)	(0.0512)	(0.0461)	(0.0635)
Self-employed	-0.0283	-0.0556	-0.0766*	0.0455
	(0.0329)	(0.0521)	(0.0406)	(0.0527)
Anglophone	0.0680*	-0.0078	0.0915**	0.0877
	(0.0372)	(0.0574)	(0.0443)	(0.0625)
House ownership	0.0579*	-0.1997***	0.0053	0.1071*
	(0.0341)	(0.0532)	(0.0435)	(0.0556)
Neighbourhood associations		0.1900**		
		(0.0888)		
Constant	9.2355***	-2.2890***	8.7988***	9.6813***
	(0.0933)	(0.1519)	(0.2189)	(0.1482)
$ln\sigma_{\varepsilon_1 v}$			-0.2539***	
			(0.0181)	
$\rho_{\varepsilon_1 v}$			0.1293	
			(0.1112)	
$ln\sigma_{\varepsilon_0 v}$				-0.0490**
				(0.0195)
$\rho_{\varepsilon_0 v}$				-0.1499
				(0.1056)
Wald test of indep. eqns		2.25		
Log likelihood		-6357.1163		
Observations		3,505		

Source: Computed by author using FinScope (2017) data and Stata 15.
Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

APPENDIX B: FULLER DESCRIPTION OF ENDOGENOUS SWITCHING REGRESSION

The error terms ν, ε_1 and ε_0 are assumed to have a trivariate normal distribution, with a mean vector of zero and following the covariance matrix:

$$\sum = \begin{bmatrix} {\sigma^2}_{\varepsilon_1} & \sigma_{\varepsilon_1\varepsilon_0} & \sigma_{\varepsilon_1\nu} \\ & {\sigma^2}_{\varepsilon_0} & \sigma_{\varepsilon_0\nu} \\ & & {\sigma^2}_{\nu} \end{bmatrix}$$

According to Maddala (1986) and Rao and Qaim (2011), ${\sigma^2}_{\nu}$ is assumed to be 1 as α can only be estimated up to a scale factor. Furthermore, as Ln W_1 and Ln W_0 are not observed together, the covariance $\sigma_{\varepsilon_1\varepsilon_0}$ is zero. In a cross-sectional sample, Ln W_1 and $Ln\, W_0$ are only partially observed, with the former being only observed for the subsample of users of financial services and the latter only observed for the subsample of non-users of financial services. In the presence of unobserved effects, the selection equation error term (ν) correlates with the error term of the outcome equations $\varepsilon_1$and ε_0 and, therefore, the expected values of ε_1 and ε_0 would be non-zero conditional on regime selection. Endogeneity can be tested with estimates of the covariance terms $\sigma_{\varepsilon_1\nu}$ and $\sigma_{\varepsilon_0\nu}$.

If $\sigma_{\varepsilon_1\nu} = \sigma_{\varepsilon_0\nu} = 0$, then the model depicts exogenous switching, whereas if $\sigma_{\varepsilon_1\nu} = \sigma_{\varepsilon_0\nu} \neq 0$, then the model exhibits endogenous switching. Thus, we need to test for significance of the coefficient of correlation between $\varepsilon_1$and ν ($\rho_{\varepsilon_1\nu} = \sigma_{\varepsilon_1\nu}/\sigma_{\varepsilon_1}\sigma_{\nu}$) and between ε_0 and ν ($\rho_{\varepsilon_0\nu} = \sigma_{\varepsilon_0\nu}/\sigma_{\varepsilon_0}\sigma_{\nu}$). The expected values of the error terms ε_1 and ε_0 are conditional on regime selection using the correlations as follows:

$$E(\varepsilon_{1i}|FI_i = 1, X_{1i}) = E(\varepsilon_{1i}|\nu_i \geq -\alpha' Z_i) = \sigma_{\varepsilon_1\nu}\frac{\phi(\alpha' Z_i)}{\Phi(\alpha' Z_i)} = \sigma_{\varepsilon_1\nu}\lambda_1$$

$$E(\varepsilon_{0i}|FI_i = 0, X_{0i}) = E(\varepsilon_{0i}|\nu_i < -\alpha' Z_i) = \sigma_{\varepsilon_0\nu}\frac{-\phi(\alpha' Z_i)}{1-\Phi(\alpha' Z_i)} = \sigma_{\varepsilon_0\nu}\lambda_0$$

Where FI is the status of the user of financial services, ϕ and Φ are the standard normal probability density function and the cumulative distribution function of the standard normal distribution, respectively. λ_1 and λ_0 represent the inverse Mills ratios for users of financial services and non-users of financial services, respectively.

The conditional expected value of the welfare of a financially included individual after correcting for sample selectivity is given as:

$$E(\text{Ln}\, W_{1i}\,|FI_i = 1) = \beta_1{}' X_{1i} + \sigma_{\varepsilon_1\nu}\lambda_1$$

Where, $\sigma_{\varepsilon_1\nu}\lambda_1$ accounts for sample selection arising from the idea that a financially included individual differs from other individuals with characteristics X and Z because of unobserved characteristics.

While the conditional expected value of welfare that the same individual would have if he/she were financially excluded is:

$$E(\text{Ln}\, W_{0i}\,|FI_i = 1) = \beta_0{}' X_{1i} + \sigma_{\varepsilon_0\nu}\lambda_1$$